198

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REPORT ON THE FISHES COLLECTED BY H. C. RAVEN IN LAKE TANGANYIKA IN 1920

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THE PRESENT paper deals with a small collection of fishes obtained by Harry C. Raven for the United States National Museum during the Universal Films Co. expedition to East Africa in 1920. None of the specimens is over 3 or 4 inches in length. They were obtained with a small seine in shallow water, chiefly at two localities, Ujiji and Kigoma, on the east shore of Lake Tanganyika. Several of them represent the young of larger species, while others are the adults of the smaller, shallow-water forms.

The fish fauna of the East African lakes is of great interest. It is composed largely of perciform fishes of the family Cichlidae, which here present a vast and confusing array of closely related forms, mostly autochthonous in single lakes. Particularly in Lakes Tanganyika and Nyasa, the cichlids (see especially Regan, 1920a, 1920b, 1921, 1922, and Trewavas, 1935) form faunas so rich in genera and species as to be scarcely comparable to any others in the world. These two rift valley lakes are probably no older than the Pliocene, and the present cichlid fauna of each has evidently developed from two or three ancestral forms that gained access to the lakes not long after their formation. This evolution of varied but closely related

forms from a single or few ancestors, which suddenly gained access to a vast, deep, unoccupied lake provided with innumerable ecological niches, has happened elsewhere, though to a lesser extent. The barbine cyprinids of Lake Lanao, the cottoids of Lake Baikal, and *Orestias* in Lake Titicaca are examples in point.

In lakes that give free access to the surrounding fauna, the various ecological niches are normally filled by fishes of diverse groups. Where access has been limited, and these niches have been filled through the recent modification of one or a few closely related forms, a rather peculiar situation arises. Certain of the evolved species develop unusual modifications, body forms, and physiognomies, very unlike those exhibited by members of the particular group elsewhere. Among the Tanganyika cichlids the *Aspro*-like *Asprotilapia* and *Enantiopus*, the *Anthias*-like *Cyathopharynx*, and the blenny-like *Telmatochromis* are examples. In Lake Lanao (see Herre, 1924 and 1933), certain species of cyprinids (*Mandibularca resinus*, *Spratellicypris palata*, *Puntius tras*) have developed very peculiar characters and physiognomies, although all the Lanao species have probably evolved rather recently from a single ancestral *Puntius*. These peculiarly adapted or modified lake genera present numerous difficulties to the taxonomist. While they probably are (in Tanganyika and Lanao at least) younger than most of the genera outside the lake, they often far surpass the latter in the extent of their anatomical modifications. Such matters make it difficult or impossible to reflect the true lines of phylogeny in any general scheme based purely on the degree of morphological difference observed in the existing forms.

Another peculiarity in these autochthonous lake faunas, in part inseparable from the great divergence among closely related forms discussed above, should be mentioned. In the evident "hurry" of evolving forms to fit ecological niches, it frequently happens that the change in minor characters of anatomy or color, or characters usually found to be of only specific value, has fallen behind the change in more striking features, usually taken to be of generic significance. To me this indicates rather clearly that these "generic" characters are phylogenetically young. Regan (1922, pp. 158–159) has noted some peculiar minor characters that run through series of genera and species of the African lakes and often enable one to tell at a glance from which lake a certain species comes. To the instances he cites may be added the tendency of many of the Victoria cichlids to retain a few light-centered ocelli on the posterior part of the soft anal fin. These ocelli are seldom seen in the Nyasa or Tanganyika species, or, if present, they are usually in a different position.

Identification of the cichlids of the African lakes is rather difficult for one who is not familiar with them and who has little or no comparative material at hand. Not only are many of the species very similar, but the major grouping is based on skeletal modifications that require some skill and practice for their proper use. It is therefore with sincere thanks that I acknowledge the kind help of Dr. Ethelwynn Trewavas, of the British Museum, in the examination of the upper pharyngeal apophysis of a cranium of *Simochromis babaulti* and in the comparison of specimens of *Telmatochromis* with the types of *T. temporalis*.

Family CYPRINIDAE

ENGRAULICYPRIS MINUTUS Boulenger

Five specimens, U.S.N.M. no. 84120, 17 to 35 mm in standard length, from Ujiji, have lost all their scales. Back brownish, sides and opercles brilliant silvery. Anal rays 22 or 23.

Family BAGRIDAE

CHRYSICHTHYS MYRIODON Boulenger

One small specimen, U.S.N.M. no. 84131, 35 mm in standard length, from Ujiji, seems to belong to this species.

Family CYPRINODONTIDAE

Subfamily LAMPRICHTHYINAE

Lamprichthyinae FOWLER, 1916, p. 416.—MYERS, 1931, p. 11.

The combination of numerous vertebrae, ctenoid scales, scaled lunate caudal fin, connected pelvic fins, presence of the basisphenoid, closely scaled preorbital, silvery color, and compressed, atherinid-like form trenchantly distinguishes the sole member of this subfamily from all other cyprinodonts.

LAMPRICHTHYS TANGANICANUS (Boulenger)

One small specimen, U.S.N.M. no. 84107, of this interesting endemic cyprinodont, from Ujiji, has unfortunately become dried. Besides this, I have examined a fine adult from Mpala, U.S.N.M. no. 92962, collected by Cunnington, and two others, Musée Congo Belge no. 2850, kindly loaned by Dr. H. Schouteden.

Body and head greatly compressed. Axis of body not angulated. Scales ctenoid. Pectoral fins set high, upper limit of their base above middle of depth at this point. Caudal lunate, closely covered with fine scales for half its length. Anal fin very long, rays 27 to 30. Dorsal shorter, rays 13 to 16, its origin behind that of anal.

Pelvic fins united to each other and to the abdomen by a thin membrane. A genital sheath of scales about the bases of the first few anal rays of the female. Preorbital relatively wide and armed with many irregular rows of very closely imbricated ctenoid scales.

Premaxillaries not expanded; they are protractile and strongly joined, the posterior processes fairly long. Dentaries firmly joined. Teeth in both upper and lower jaws conical, in many rows, the outer ones slightly enlarged and situated on the lips outside the mouth. Vomerine teeth and pseudobranchiae absent. Near its widened distal end, the maxillary is loosely connected to the outer skin of the preorbital, allowing considerable freedom of movement. Vertebrae, counting hypural, 40 or 41. Haemal arches expanded for the extension of the coelom and the large air bladder into the caudal region as far as the twenty-fourth vertebra. Hypocoracoid very large, vertically expanded; actinosts set high on the arch, half on the hypocoracoid and half on the hypercoracoid. Flange of the cleithrum extending far upward to upper end of pectoral arch.

The peculiar atherinid-like habitus and color of this fish sets it off as one of the most interesting specializations of the cyprinodonts. Evidently these little fishes have the same habits in the sealike expanse of Tanganyika as have the atherines in the ocean.

Subfamily FUNDULINAE

APLOCHEILICHTHYS PUMILUS (Boulenger)

There are 48 specimens, U.S.N.M. no. 84158, of a small *Aplocheilichthys*, the largest 25 mm in standard length, which are placed under this name with strong doubt. They are labeled Nyanga, Lake Tanganyika.

I think there is a distinct probability that some confusion has occurred in Boulenger's placement of the Victoria and Tanganyika specimens of this genus (Boulenger, 1915, pp. 45–46). *Aplocheilichthys dhonti* (Boulenger, 1919, p. 17) is certainly different from what he calls *pumilus*, chiefly because of the different dorsal and anal fin contours, distinctly noticeable in the specimens of *dhonti* I have seen. I have examined three specimens labeled *H. pumilus* from Boulenger's material. One of them (U.S.N.M. no. 94327) from the Lufuko River (collector, Stappers) has a long peduncle and the middle dorsal and anal rays longest; I believe it represents *A. dhonti* or a related form. The second (U.S.N.M. no. 86643) is from the Lukuga River (collector, Dhont), and the third (U.S.N.M. no. 94297) is one of Degen's specimens from Entebbe, Lake Victoria; both of these have a deep peduncle and the posterior dorsal and anal rays longest; they fall into Boulenger's *pumilus*. The 48 specimens of Raven's collection have the long posterior dorsal and anal rays of *pumilus*,

but they have a long peduncle, the depth entering the length 1.66 or more times. Further, they do not have the distinctly vertical lower jaw of the Entebbe and Lukuga fishes, and they are more slender and delicately formed. It is very likely that the Victoria and Tanganyika *pumilus* are different forms and that at least two Tanganyika species were included by Boulenger under *pumilus*, but in the absence of good material and a revision of the many species described recently by Ahl, I can do nothing toward straightening out the matter. If the Victoria and Tanganyika *pumilus* are different, the name *pumilus* must go with the latter, since the original description was based on Tanganyika fish, the Degen Victoria examples merely having been mentioned.

All the *pumilus*-like species have practically the same scale and fin counts, and their separation is therefore difficult without careful examination of specimens in very good condition. There is no justification for the continued use, by some authors, of the later, emended generic name *Haplochilichthys*.

Family SERRANIDAE

LATES MICROLEPIS Boulenger

Two small specimens, U.S.N.M. no. 84132, 36 and 43 mm in standard length, from Ujiji, are referred to this species. They have a wide, very irregular, lateral band from eye to caudal peduncle, and a narrower, less well developed band above this. Otherwise the cheeks and sides are silvery; the membranes of the spinous dorsal and of the pelvics are blackish. There are 18 or 19 developed rakers on the entire first gill arch, and some rudiments at either end.

Family CICHLIDAE

TILAPIA NILOTICA (Linnaeus)

There is a single specimen, U.S.N.M. no. 84130, 47 mm in standard length, from Kigoma.

LIMNOTILAPIA DARDENNII (Boulenger)

Six small specimens, the largest 52 mm in standard length, are in the collection; three are from Ujiji (U.S.N.M. no. 84105) and three from Kigoma (U.S.N.M. no. 84104).

LOBOCHILOTES LABIATUS (Boulenger)

Two young specimens, U.S.N.M. no. 84119, 45 and 54 mm in standard length, from Ujiji. In appearance they are strikingly unlike the adult figured by Boulenger (1915, p. 280, fig. 191). Superficially, the

hypertrophy of the lips is not noticeable, but on close examination the lips show thickening, and the triangular points have just begun their development. The ground color is pale brownish, marked with 14 conspicuous, vertical, dark bands, the first through the eye and the last on the base of the caudal. Each bar that abuts on the dorsal or anal forms a basal spot on the fin. On the dorsal these basal spots are carried outward and anteriorly on the fin as a bar. Caudal faintly spotted. Pectorals plain. Pelvics with membrane faintly brownish. Dorsal fin lappets tipped with brown. Both specimens have dorsal XVIII-10, anal III-7, and lateral lines 12+14, while the lateral scales are 34 and 33.

PERISSODUS GRACILIS, new species

PLATE 1, B

Holotype.—U.S.N.M. no. 84123, 46 mm in standard length, from Kigoma, Lake Tanganyika; collected in February 1920 by H. C. Raven.

Paratypes.—U.S.N.M. no. 102111, two specimens, 48 and 55 mm in standard length; same locality data as holotype.

Since its description by Boulenger in 1898, the genus *Perissodus* has been known only through the single 100 mm type specimen of *P. microlepis* in the British Museum. The discovery of three examples in Mr. Raven's collection is therefore of great interest. These specimens differ markedly from Boulenger's description in a few points. In view of our lack of knowledge of specific variation in *P. microlepis*, I have hesitated to describe my examples as new, but the differences, though small, appear to be fairly constant in the three, and are similar in character to those that have been found to be of specific value in other Tanganyika cichlids.

Diagnosis.—Differs from *Perissodus microlepis* in having a greater number of gill rakers, smaller mouth, more slender form, more numerous soft anal and dorsal rays, 17 instead of 18 dorsal spines, slightly smaller scales, a different lateral line count, and longer pelvic fins. In the peculiar dentition, the thick lips, and most general characters, the species is similar to *P. microlepis*. The head length is proportionally about the same as in *P. microlepis*, and since these specimens are much smaller than the type of that species, it might be suspected that the proportional head length in adults of *gracilis* would be smaller than in Boulenger's species.

Description.—Depth of body somewhat over 4 in standard length, length of head 3.3 to 3.4. Head 2.3 times as long as broad; snout a little broader than long, a little longer than eye, which is 3.1 to 3.4 times in length of head and is equal to or longer than the bony interorbital. Lower jaw projecting maxillary extending barely to

below anterior margin of eye; 19 or 20 teeth in the upper jaw, 16 in the lower; 3 series of scales on cheek. Gill rakers rather long, 18 to 20 on lower limb of first arch, 5 to 7 on upper limb.

Dorsal XVII–11 or 12, spines increasing in length to the last. Anal III–9 to 11. Pectoral 13, two-thirds length of head. Pelvics I–5, reaching or surpassing the vent. Caudal with 8 principal rays above its middle and 8 below, its edge emarginate. Caudal peduncle about 1.66 times as long as deep.

Scales 67 to 70 to hypural joint. Lateral lines two in number, very distinct, 47 to 49 scales in upper and 23 to 27 in lower to hypural joint. Transverse scales between first scale of lateral line and base of first dorsal spine 7½, between front part of lateral line and base of pelvics 17 or 18.

Color dull brownish, with traces of broad, dark, transverse bands showing only along the back, the first above the gill slit, the second over the last third of pectoral, the third above the vent, the fourth over the anal origin, the fifth over the middle of the anal, the sixth over end of anal, and the seventh on the caudal peduncle. A dark blotch at middle of caudal base.

Counts and measurements in millimeters.—(Under each item, the holotype is mentioned first.) Dorsal XVII–12, XVII–11, XVII–12. Anal III–11, III–9, III–10. Pectoral 13–13, 13–13, 13–13. Pelvic I–5, I–5, I–5. Caudal 16, 16, 16. Gill rakers on lower and upper limbs (counted on excised first arch of left side) 19+5, 18+6, 21+7. Lateral scales to hypural joint 70, 67, 69. Lateral lines (lower counted to hypural joint) 49+27, 48+23, 47+24. Transverse scales (origin lateral line to first dorsal spine, and forward part lateral line to pelvic origin) 7½/18, 7½/17, 7½/18. Standard length 46, 48, 55. Depth 10.5, 11.5, 13. Head 14, 14.5, 16.5. Eye 4.5, 4.5, 4.5. Bony interorbital 3.5, 3.5, 4.5. Length caudal peduncle 9.5, 9, 10.5. Least depth caudal peduncle 4.5, 5, 6. Snout tip to maxillary end 5, 6, 6. Lower jaw 4.5, 5, 5.

HAPLOCHROMIS HOREI (Günther)

We have eight specimens, U.S.N.M. no. 84127, the largest 63 mm in standard length, from Ujiji. They have the typical long snout, spotted fins, and barred body of this species. Sometimes there is a single longitudinal band, sometimes two or three. The dark spot at the upper posterior corner of the opercle is plain in all, but the oblique streak at the junction of the interopercle and subopercle and the spotting of the forehead are occasionally faint. Article 19 of the International Rules requires that the original orthography of the specific name be retained.

CALLOCHROMIS PLEUROSPILUS (Boulenger)

The genus *Callochromis* Regan is composed of four species described by Boulenger (1915, pp. 421–425). The 41 examples recorded below are smaller than most of Boulenger's but are large enough (average about 40 mm in standard length) for comparison. I have, however, experienced great difficulty in their determination and have come to the conclusion that Boulenger's arrangement must be amended. Either some of the species must be synonymized or more than four recognized.

The 41 specimens, U.S.N.M. nos. 84117 and 84125, are all from Ujiji. On no character can I separate them into more than one form, yet different examples would fall into *C. rhodostigma* and *C. pleurospilus*. The variation in the extent of the mouth is considerable, some having the maxillary reaching slightly behind the front of the eye, while in others it does not nearly reach below the eye. There is every gradation between. The soft anal rays vary from 5 to 7 in number (normally 7), and the teeth in the outer row in the upper jaw vary from 46 to over 60. Scales between the beginning of the lateral line series and the dorsal origin 4½ in most and 3½ in a few.

It is possible that in *Callochromis* we have one of those genera in which the species are most easily determined by the coloration of the fresh specimens, but much of the color of my examples is gone. All have a prominent dark opercular spot, dark tipped dorsal lappets, and some indication of an indistinct row or connected series of median lateral spots. In this they seem to agree with Boulenger's figures (Boulenger, 1906, pl. 39, fig. 2 and 2a).

CALLOCHROMIS MACROPS (Boulenger)

One small example, U.S.N.M. no. 102084, 29 mm in standard length, was separated from the lot of *C. pleurospilus* from Ujiji because of its obviously different physiognomy, greater depth, more compressed body, wider interorbital, different color, and its longer and more numerous dorsal spines (dorsal XVI–12). In color the lateral spots appear inclined to form a trace of faint, wide vertical bands, which alternate with dark areas along the base of the dorsal fin. I place the specimen here because of its great resemblance to Boulenger's original figure of one of the types of *macrops* (Boulenger, 1898, pl. 3, fig. 2). After examining this fish and the series of *pleurospilus*, I am inclined to doubt the specific identity of *Pelmatochromis melanostigma* (Boulenger, 1906, p. 567, pl. 38, fig. 1) with the figured type of *macrops*, in spite of the smaller size of the latter.

SIMOCHROMIS BABAULTI Pellegrin

Simochromis babaulti PELLEGRIN, 1927, p. 500 (Ouvira, Lake Tanganyika); 1928, p. 82, fig. 1 (figure of type).

Four specimens, U.S.N.M. no. 84129, the largest 61 mm in standard length, are from Kigoma; one has been partially skeletonized, and another has been presented to the British Museum.

This species has hitherto been known from a single specimen of approximately the same size as our largest one. The four examples show the following counts: Dorsal XVI–9; XVI–9; XVII–9; XVI–9. Anal III–8; III–8; III–7; III–7. Pectoral 16 in all four. Lateral lines 21+10, 21+12, 22+11, 21+12. Lateral scales 29, 30, 29, 30. Gill rakers on upper and lower limbs of first arch 3+7 in all four. Bicuspid teeth in first row in upper jaw 25, 29, 28, 24. Caudal truncated. Head about 3 in standard length.

There are 8 or 9 rather wide, vertical, dark bands on a lighter background. Head rather dark, lightening on opercles, on throat, and on breast. Base of pectoral rather dark. Fins nearly plain except for a dark longitudinal streak through the membranes of the first six dorsal spines in one example and a faint darkening of the lappets at the fin edge.

An interesting problem has arisen concerning the systematic position of this fish. In his review of the Tanganyika genera, Regan (1920a, p. 35) places *Simochromis* in the *Tilapia* group, which is characterized by the exclusion of the basioccipital from the articular surface of the upper pharyngeal apophysis. In examining the dentition of *S. babaulti* I was struck with its remarkable similarity to that of the Nyasa *Pseudotropheus tropheops* (Regan, 1921, p. 681, fig. 2a). This had, indeed, already been noted by Pellegrin. Further, *S. babaulti* has much of the appearance of *P. tropheops*, but *Pseudotropheus* is a member of the *Haplochromis* group, in which the basioccipital enters the facet of the upper pharyngeal apophysis. Examination of a cranium of *S. babaulti* was not wholly satisfactory, owing to the small size of the specimen and my unfamiliarity with the group.

Dr. Ethelwynn Trewavas, of the British Museum, has been so kind as to examine this cranium of *S. babaulti* (as well as a complete specimen) in the light of her extensive knowledge of the African Cichlidae. She writes:

> I agree with you that the pharyngeal apophysis is not of the *Tilapia* type; neither is it of the typical *Haplochromis* type. It is a young fish with the pharyngeal apophysis very weakly developed, but it is possible to see that the basioccipital does not contribute to the facets for the pharyngeal. Nevertheless it (the basioccipital) extends forward so as to meet the prootic at the antero-lateral side of the facet, and the suture between parasphenoid and basi-

occipital forms the postero-lateral edge of the facet. This is unlike *Tilapia* in which the meeting of prootic and basioccipital is at the postero-lateral side of the apophysis, and the basioccipital not only takes no share in the facet, but also none in the apophysis.

Comparison of this cranium with that of a young *Simochromis diagramma* shows a very close agreement between the two. Moreover, in the skeleton of an adult *S. diagramma* the postero-lateral corner of each facet is formed by the basioccipital. It seems therefore that *Simochromis* belongs to the *Haplochromis*-group and not to the *Tilapia*-group, and the possibility of a very close relationship with *Pseudotropheus* will have to be considered. Meanwhile this species, *S. babaulti*, although it so closely resembles *Pseudotropheus tropheops*, is more like *Simochromis diagramma* in its pharyngeal dentition and in the depth of the preorbital, and is correctly assigned to this genus.

I defer to Dr. Trewavas' opinion in regard to the generic position of *S. babaulti*, but I wish to point out that if Boulenger's figure of the dentition of *S. diagramma* (Boulenger, 1915, p. 275, fig. 187) can be relied on, *S. babaulti* differs considerably. Boulenger figures the inner rows of small teeth in the upper jaw as running back behind the enlarged conical lateral teeth and shows the posterior projections of the lower dentition as composed of several rows. In *S. babaulti*, on the contrary, there are three rather even rows of small tricuspid treeth behind the main outer row of bicuspid ones in the front of the upper jaw, but the small inner teeth are not continued backward behind the lateral enlarged conical ones. Further, the posterior prolongations of the lower dental patch are formed on each side of the lower jaw by a single regular row of conical teeth. In this, *S. babaulti* is practically identical with *Pseudotropheus* and differs distinctly from Boulenger's figure of *S. diagramma*.

The difference between *Simochromis* and *Pseudotropheus* is certainly very slight, and it may be that the genera will have to be merged, unless hitherto unknown characters are employed. This brings up the question of the autochthonous nature of certain of the Tanganyika and Nyasa genera. If *Simochromis* and *Pseudotropheus* are indeed convergent rather than identical stocks, the parallelism is astounding.

Four very small specimens, U.S.N.M. no. 84118, 15 to 34.5 mm in standard length, from Ujiji, are placed here with great hesitancy. They have the posterior extensions of the dentition uniserial, but in conical lateral teeth of the upper jaw are little developed. They have the rounded snout of *S. babaulti* and the same general form, but the body is slenderer (about 3.5 in the largest example) and the head is shorter (3.3 in the largest). The counts of the two largest ones are: Dorsal XVII–9 and XVI–8, anal III–7 in both, lateral lines 23+9 and 22+10, and lateral scales 30 and 32. These examples

may well be a new form close to *S. babaulti*, or perhaps the young of *S. diagramma;* they are certainly not any other cichlid yet reported from Tanganyika.

STAPPERSIA SINGULARIS Boulenger

One specimen, U.S.N.M. no. 84110. 40 mm in standard length, was collected at Kigoma. Dorsal XIV–13. Anal III–10. Lateral scales to end hypural fan 37. Upper lateral line 26, lower 11. Gill rakers 9 blunt, rounded knobs on lower limb of first arch, and one short, slender raker on upper limb between the angle and the superior fleshy lobe. Color pale brownish. This example agrees in most characters with the accounts of Boulenger (1915, p. 450, and 1920, p. 53) and of Regan (1920a, p. 47), but the low soft anal count is notable.

Besides the two types described by Boulenger, I find only one other record of the capture of this rare fish (Pellegrin, 1927, p. 500).[1] The elongate inner pelvic rays form a notable modification shared, among cichlids, only with two other genera, *Xenotilapia* and *Enantiopus*, both also from Tanganyika.

TELMATOCHROMIS TEMPORALIS Boulenger

Seven specimens, U.S.N.M. no. 84126, 26.5 to 50 mm in standard length, are from Kigoma; one of these is now in the British Museum. The other six show the following counts (given in decreasing order of size of examples): Dorsal XXII–7, XXII–7, XX–7, XX–7, XX–7, XX–7. Anal VI–6, VI–6, V–7, VI–6, VI–6, V–6. Lateral lines 25+2, 23+5, 26+6, 24+5, 22+4, 22+3. Lateral scales 34, 33, 36, 33, 33, 33.

Dr. Trewavas has been so kind as to compare one of the Kigoma fish with the types and other specimens of *T. temporalis* in the British Museum. She remarks that my fish has a smaller mouth than any in the British Museum. At my request she also examined the teeth of the types and finds that the lateral teeth of the jaws are all unicuspid, but that in one young example the one or two lateral teeth immediately behind the enlarged ones have vestigial cusps. In the Kigoma specimens, on the contrary, I find the six or seven teeth behind the enlarged ones to be tricuspid, and the ones posterior to these unicuspid.

The tricuspid lateral teeth, the smaller mouth, and the lower scale count might be taken to indicate a species distinct from *T.*

[1] Since this was written, Borodin (1936), in a paper marred by much misspelling and many evident egregious errors of generic and specific placement, has recorded 26 specimens from Ujiji. Until they are re-examined by a competent ichthyologist, I question the identification of these specimens.

temporalis, but I can not believe this to be the case, for several reasons. My specimens all show the typical coloration as figured by Boulenger, the temporal band, the dark basal pectoral bar, the mottled fins, and the plain brownish body color, although they all have, in addition, a small, more or less distinct dark spot in the middle of the caudal base. As for the difference in the lateral scale count, I believe this to be due to the fact that Boulenger counted some scales out beyond the hypural on the caudal base. In the six specimens before me, the size of the mouth and the shape of the head vary greatly. In the largest and the two smallest the maxillary reaches about midway between the nostril and the eye; these also have a less declivous snout profile. In the other three the snout profile is more declivous and rounded and the maxillary reaches variously almost to, just to, or slightly behind the anterior part of the eye. The tricuspid lateral teeth form a difference of some weight. However, the characters of *T. temporalis* have been known only through eight or nine examples taken at relatively few localities. I feel that when this and other species are known through large samples from an adequate number of localities, it will be found that dental and other variations will be somewhat greater than now suspected.

TELMATOCHROMIS BIFRENATUS, new species

PLATE 1, A

Holotype.—U.S.N.M. no. 84121, 40 mm in standard length, from Kigoma, Lake Tanganyika; collected in February 1920 by H. C. Raven.

Paratype.—U.S.N.M. no. 102112, same size and locality as holotype.

Only two species of this genus, first described by Boulenger, are certainly known, although three forms of uncertain generic position described by Steindachner (1909, pp. 400–404) in the genus *Julidochromis* have to be considered. The present new form differs widely, however, from each of Steindachner's unfigured species in one or more important characters of squamation, fin count, body proportions, or color. Further, it cannot be *Julidochromis macrolepis* Borodin (1931, p. 51; 1936, p. 21, pl. 1, fig. 5), which, from the wretched figure, looks to me, as it did to Regan (1932, p. 28), like a *Lamprologus*.

Diagnosis.—Closely allied to *T. vittatus* Boulenger, but differing distinctly in having a more elongate body, a longer head, a longer and less bluntly rounded snout, a larger and less inferior mouth, a lower lateral scale count, a longer and more slender caudal peduncle, and two lateral dark bands on the body instead of one.

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Description.—Depth of body 5 in standard length, length of head 3.6. Head 2.56 times as long as broad; profile of snout descending in a strong curve, but much less bluntly rounded than in *T. vittatus*; snout longer than eye, which is 3.66 in length of head and nearly a third larger than interorbital width; mouth larger than in *T. vittatus* but not reaching to below eye. Front row of teeth of each jaw composed of 8 to 10 enlarged, conical, and very slightly flattened teeth. Backing these is a crowded band of four or five very irregular rows of small tricuspid teeth. The posterior extensions of both the upper and lower dentition form a single row of very small teeth, which become progressively smaller and lose the two outer cusps toward the end of the row. Gill rakers 5 or 6 very short, stubby points, at and just before the angle of the upper and lower limbs of the first gill arch.

Dorsal XXI or XXII–8, spines increasing in length to the last, which is not half the head length. Anal VII–5 or 6, the last spine longer than last dorsal. Pectoral rather short, about as long as head without opercle. Pelvics I–5, the first soft ray produced, reaching anus. Caudal rounded, with 7 branched rays above middle and 7 below. Caudal peduncle 1.5 times as long as deep.

Scales 36 to 38 to hypural joint. Lateral lines two, the upper very irregular, with 26 scales, the lower with 6 or 7. Cheeks, opercles, and nape as far as dorsal origin naked, as well as a strip between the scales along the dorsal base and the lateral line, as far back as the fifth or sixth dorsal spine. Body scales rather irregular in size and arrangement, large on peduncle and middle of sides, growing smaller and crowded above upper lateral line and on belly. Dorsal and anal naked, caudal finely scaled nearly to its end.

Ground color yellowish brown. Nape and forehead irregularly mottled with dark brown. A dark-brown band down midline of back, involving the base of the dorsal fin but not extending on the peduncle or nape. Another brown longitudinal line extends from above eye along upper part of sides, fading out under end of spinous dorsal fin. A third dark-brown line extends from lower third of eye back through the elongate opercular point, above the pelvic base, and along the sides just below the midline, finally fading at caudal base; at the pectoral, this line involves an intense dark spot (but not a bar) above the fin base, and on the posterior half of the side it widens and breaks up into irregular, vertical, oblique patches. On the snout an irregular, mottled pattern forms a line extending forward from each eye and meeting in front; another dark bar connects the lower part of each eye with the mouth. Pectorals and pelvics plain. Caudal faintly dusky. Lappets of spinous dorsal tipped with dark. A narrow dark edging along entire border of anal; this may be faint or strong.

Counts and measurements in millimeters of holotype.—(Figures in parentheses refer to the paratype.) Dorsal XXI–8 (XXII–8). Anal VII–5 (VII–6). Lateral scales to hypural end 36 (38). Lateral lines 26+6 (26+7). Standard length 40 (40). Total length 47 (48). Depth 8. Head length 11. Head width 4.3. Eye 3. Interorbital 1.9. Snout 3.7. Least depth peduncle 4. Length peduncle (from anal fin) 6.

LAMPROLOGUS MODESTUS Boulenger

One small example, U.S.N.M. no. 84122, from Kigoma, 32 mm in standard length, appears to belong to this species. It has a larger eye and shorter snout than my examples of *L. mondabu*. The lateral scales to end of hypural fan are 35, while the upper lateral line count is 25, the lower 7. The depth is about 3.6 in the standard length and the caudal appears to be truncate. There are 9 rakers, the first very short, on the lower limb of the first gill arch. Dorsal XIX–9. Anal V–6.

LAMPROLOGUS MONDABU Boulenger

Four examples of this long-snouted species, U.S.N.M. no. 84128, from Kigoma, 60 to 80 mm in standard length, agree admirably with Boulenger's description and figure, which were based on two specimens from Kaboge. My count of the dorsal is XIX–9, and of the anal V–6 or 7. Scales from upper end of gill opening to end of hypural fan 36 to 40. These scale counts are lower than Boulenger's but agree with his figure. Caudal distinctly emarginate.

LAMPROLOGUS RETICULATUS Boulenger

Two small specimens, U.S.N.M. no. 102113, from Kigoma, 34 and 40 mm in standard length, show the dark, reticulated pattern of this species. The caudal is truncated. Dorsal XIX–9. Anal VIII–8. Lateral scales to end hypural 36 to 37. Upper lateral line 21 or 22 (indistinct or interrupted near end); lower short, 6 or 7. I can count only 13 rakers on lower part of first gill arch. These specimens have the elongate form of the type and only known example of *L. reticulatus* and are in no way similar to *L. calliurus* Boulenger or *L. finalimus* Nichols and La Monte (1931, p. 1).

LITERATURE CITED

Borodin, Nikolai.

1931. Some new cichlid fishes from Lakes Victoria and Tanganyika, central Africa. Proc. New England Zool. Club, vol. 12, pp. 49–54.

1936. On a collection of freshwater fishes from Lakes Nyasa, Tanganyika, and Viktoria in central Africa. Zool. Jahrb. (Abt. Syst.), vol. 68, no. 1, pp. 1–34, 1 pl.

BOULENGER, GEORGE ALBERT.

1898. Report on the collection of fishes made by Mr. J. E. S. Moore in Lake Tanganyika during his expedition, 1895–96. Trans. Zool. Soc. London, vol. 15, pt. 1, no. 1, pp. 1–30, 8 pls.

1906. Fourth contribution to the ichthyology of Lake Tanganyika. Report on the collection of fishes made by Dr. W. A. Cunnington during the Third Tanganyika Expedition, 1904–1905. Trans. Zool. Soc. London, vol. 17, pt. 6, no. 1, pp. 537–600, 12 pls.

1915. Catalogue of the fresh-water fishes of Africa in the British Museum, vol. 3. London.

1919. On a collection of fishes from Lake Tanganyika, with descriptions of three new species. Proc. Zool. Soc. London, 1919, pp. 17–20.

1920. Poissons de la Mission Stappers, 1911–1913, pour l'exploration hydrographique et biologique des lacs Tanganika et Moéro. Rev. Zool. Africaine, vol. 8, fasc. 1, pp. 1–57.

FOWLER, HENRY WEED.

1916. Notes on fishes of the orders Haplomi and Microcyprini. Proc. Acad. Nat. Sci. Philadelphia, vol. 68, pp. 415–439.

HERRE, ALBERT WILLIAM.

1924. Distribution of the true fresh-water fishes in the Philippines. I. The Philippine Cyprinidae. Philippine Journ. Sci., vol. 24, no. 3, pp. 249–306, 2 pls.

1933. The fishes of Lake Lanao: a problem in evolution. Amer. Nat., vol. 67, pp. 154–162.

MYERS, GEORGE SPRAGUE.

1931. The primary groups of oviparous cyprinodont fishes. Stanford Univ. Publ., Univ. Ser., Biol. Sci., vol. 6, no. 3, pp. 243–254.

NICHOLS, JOHN TREADWELL, and LA MONTE, FRANCESCA.

1931. A new *Lamprologus* from Lake Tanganyika. Amer. Mus. Nov., no. 478, 2 pp.

PELLEGRIN, JACQUES.

1927. Mission Guy Babault. Poissons du lac Tanganyika. Bull. Mus. Hist. Nat., 1927, pp. 499–501.

1928. Mission Guy Babault. Poissons de la région des lacs Kivu et Edouard. Bull. Mus. Hist. Nat., 1928, pp. 82–86.

REGAN, CHARLES TATE.

1920a. The classification of the fishes of the family Cichlidae. I. The Tanganyika genera. Ann. Mag. Nat. Hist., ser. 9, vol. 5, pp. 33–53.

1920b. A revision of the African cichlid fishes of the genus *Tylochromis*. Ann. Mag. Nat. Hist., ser. 9, vol. 5, pp. 163–169.

1921. The cichlid fishes of Lake Nyassa. Proc. Zool. Soc. London, 1921, pp. 675–727, 6 pls.

1922. The cichlid fishes of Lake Victoria. Proc. Zool. Soc. London, 1922, pp. 157–191, 4 pls.

1932. The cichlid fishes described by Borodin from Lakes Tanganyika and Victoria. Proc. New England Zool. Club, vol. 13, pp. 27–29.

STEINDACHNER, FRANZ.

1909. Ueber einige neue Fischarten aus dem Tanganyikasee . . . sowie über *Caenotropus punctatus* M. Tr. nach Exemplaren aus Surinam. Anz. Akad. Wiss. Wien, vol. 46, pp. 399–404.

TREWAVAS, ETHELWYNN.

1935. A synopsis of the cichlid fishes of Lake Nyasa. Ann. Mag. Nat. Hist., ser. 10, vol. 16, pp. 65–118.

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